

REMARKS

By this Amendment, Applicant proposes to amend claim 10 and cancel claim 19 due to its incorporation into independent claim 10. Claims 1-10, 14, 15, 17-18, and 20-24 remain pending with claims 1-9 and 20 being withdrawn.

Interview Summary

At the outset, the Examiner is thanked for the consideration given during the Interview of August 28, 2007. The substance of the interview is reflected in the following remarks.

Rejection of Claim 10 Under 35 U.S.C. § 102(b) & Claims 18 and 19 Under 35 U.S.C. § 103(a)

In the Final Office Action, the Examiner rejected claim 10 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,162,713 to *Chen et al.* Further, in the Final Office Action, the Examiner rejected claims 18 and 19 under 35 U.S.C. § 103(a) as being unpatentable over *Chen et al.* (U.S. Patent No. 6,162,713) in view of *Ku et al.* (U.S. Patent Publication No. 2004/0266182). These rejections, as they may apply to remaining claims 10 and 18, are respectfully traversed.

Claim 10, upon entry of the proposed amendment, is directed to a method for manufacturing a semiconductor device comprising: placing a layer of gate oxide material over a substrate; forming a layer of silicided gate electrode material over said gate oxide, comprising: forming a layer of polysilicon material over said layer of gate oxide material, forming a layer of an alloy comprising a first metal and a second metal

over said layer of polysilicon material, and annealing said layer of said alloy comprising said first metal and said second metal to form a layer of silicided gate electrode material including said first metal and said second metal; patterning said layer of silicided gate electrode material to form a silicided gate electrode; and forming source/drain regions in said substrate and forming silicided source/drain contact regions in said source/drain regions subsequent to forming said silicided gate electrode. Claim 18 depends from claim 10 and recites a ratio of an atomic percent of said first metal to said second metal in said silicided gate electrode ranges from about 9:1 to about 2:3.

It is the Examiner's position that *Chen et al.*, Figures 4A-5H, disclose a method for manufacturing a semiconductor device as recited in claim 10. With regard to the subject matter of claim 19 (now incorporated into claim 10), the Examiner relied on *Ku et al.* as teaching the forming of silicided source/drain contact regions.

To the contrary, there is no teaching or suggestion that contact regions of the source/drain are silicided subsequent to forming said silicided gate electrode. Instead, as shown and described in connection with FIG. 2C of *Ku et al.*, a layer of nickel alloy 30 may be formed over the gate structure, source/drain regions, and isolation regions. All regions with the alloy are annealed at the same time. Accordingly, a silicide region is formed on the upper surface of the first conductor layer in conjunction with the silicide regions formed on the upper surface of the source/drain regions.

Thus, it is respectfully submitted that *Chen et al.* fail to teach or suggest that contact regions of the source/drain are silicided subsequent to forming said silicided gate electrode and *Ku et al.* fail to overcome the deficiencies of *Chen et al.*.

In view of the above, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claim 10 under 35 U.S.C. § 102(b) and the rejection of claims 18 and 19 under 35 U.S.C. § 103(a). Applicant further submits that claim 18 is in condition for allowance at least by virtue of its dependency from allowable claim 10.

Rejection of Claims 21 and 22 Under 35 U.S.C. § 103(a)

In the Final Office Action, the Examiner rejected claims 21 and 22 under 35 U.S.C. § 103(a) as being unpatentable over *Chen et al.* (U.S. Patent No. 6,162,713) in view of *Amos et al.* (U.S. Patent No. 6,846,734). This rejection is traversed.

Claim 21 is dependent from claim 18 and recites "wherein said first metal is cobalt and said second metal is nickel". Claim 22 depends from claim 10 and recites "wherein said first metal is cobalt and said second metal is nickel".

The Examiner recognizes that *Chen et al.* fail to disclose the first metal is cobalt and the second metal is nickel. Accordingly, *Amos et al.* are applied as disclosing the first metal for the alloy layer are Co or Ni and the second metal are Co or Ni (referring to column 9, lines 10-25 thereof).

To the contrary, it is respectfully submitted that *Amos et al.* fail to overcome the deficiencies of *Chen et al.* as pointed out above, and the combination therefore also fails to teach or suggest the claimed invention.

In view of the above, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claim 21 and 22 under 35 U.S.C. § 103(a).

Applicant further submits that claims 21 and 22 are in condition for allowance, at least by virtue of their dependency from allowable claim 10, either directly or indirectly.

Rejection of Claim 24 Under 35 U.S.C. § 103(a)

In the Final Office Action, the Examiner rejected claim 24 under 35 U.S.C. § 103(a) as being unpatentable over *Chen et al.* (U.S. Patent No. 6,162,713) in view of Remarks. The rejection is traversed.

Claim 24 depends from claim 10 and recites a ratio of a thickness of the layer of polysilicon material to a thickness of the layer of the alloy is at least approximately 3.6:1.

The Examiner recognizes that *Chen et al.* fail to disclose a ratio of a thickness of the layer of polysilicon material to a thickness of the layer of the alloy to be at least approximately 3.6:1. According to the Examiner, the selection of those parameters such as energy, concentration, temperature, time, molar fraction, depth, thickness, etc., would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art.

To the contrary, it is respectfully submitted that the Examiner's Remarks fail to overcome the deficiencies of *Chen et al.* as pointed out above, and the combination therefore also fails to teach or suggest the claimed invention. .

In view of the above, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 24 under 35 U.S.C. § 103(a). Applicant further submits that claim 24 is in condition for allowance, at least by virtue of its dependency from allowable claim 10.

Rejection of Claim 23 Under 35 U.S.C. § 103(a)

In the Final Office Action, the Examiner rejected claim 23 under 35 U.S.C. § 103(a) as being unpatentable over *Chen et al.* (U.S. Patent No. 6,162,713) in view of *Lee* (U.S. Patent No. 5,872,057). This rejection is respectfully traversed.

Claim 23 depends from claim 10, and further comprising 'implanting a dopant into said layer of polysilicon material affecting a work function of said silicided gate electrode'.

The Examiner recognizes that *Chen et al.* fail to teach implanting a dopant into the polysilicon material affecting a work function of the silicided gate electrode. Accordingly, *Lee* is applied as disclosing a silicided gate electrode having polysilicon layer (22) doped to further improve its conductivity (referring to column 2, lines 4-14 thereof).

To the contrary, it is submitted that *Lee* fails to overcome the deficiencies of *Chen et al.* as pointed out above, and the combination therefore also fails to teach or suggest the claimed invention.

In view of the above, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claim 23 under 35 U.S.C. § 103(a). Applicant further submits that claim 23 is in condition for allowance, at least by virtue of its dependency from allowable claim 10.

Rejection of Claims 14 and 15 Under 35 U.S.C. § 103(a)

In the Final Office Action, the Examiner rejected claims 14 and 15 under 35 U.S.C. § 103(a) as being unpatentable over *Chen et al.* (U.S. Patent No. 6,162,713) in

view of Lee (U.S. Patent No. 5,872,057) and further in view of Amos *et al.* (U.S. Patent No. 6,846,734). This rejection is respectfully traversed.

Claim 14 depends from claim 23 as further including forming a capping layer over said layer of said alloy, said capping layer configured to affect a doping profile of said dopant. Claim 15 depends from claim 14 wherein said capping layer comprises a transition metal-nitride.

The Examiner recognizes that *Chen et al.* and *Lee* fail to disclose a capping layer comprising transition metal-nitride. Accordingly, *Amos et al.* are applied as disclosing a capping layer (60), comprising a transition metal nitride such as TiN, formed on the surface of the metal alloy (58), (referring to column 9, lines 42+ thereof) for preventing oxygen from diffusing into the structures which in turn affect a doping profile of the dopant.

To the contrary, it is submitted that *Amos et al.* fail to overcome the deficiencies of *Chen et al.* and *Lee* as pointed out above, and the combination therefore also fails to teach or suggest the claimed invention.

In view of the above, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 14 and 15 under 35 U.S.C. § 103(a). Applicant further submits that claim 14 and 15 are in condition for allowance, at least by virtue of their dependency from allowable claims 23 and 14, respectively.

**CONCLUSION**

Applicant respectfully requests that this Amendment under 37 C.F.R. § 1.116 be entered by the Examiner, placing claims 10, 14, 15, 18, and 21-24 into condition for allowance. Applicant submits that the proposed amendments of claim 10 do not raise new issues or necessitate the undertaking of any additional search of the art by the Examiner, since all of the elements and their relationships claimed were either earlier claimed or inherent in the claims as examined. Therefore, this Amendment should allow for immediate action by the Examiner.

Furthermore, Applicant respectfully points out that the final action by the Examiner presented some new arguments as to the application of the art against Applicant's invention. It is respectfully submitted that the entering of the Amendment would allow the Applicants to reply to the final rejections and place the application into condition for allowance.

Finally, Applicant submits that entry of the amendment would place the application into better form for Appeal, should the Examiner dispute the patentability of the pending claims.

In view of the foregoing remarks, Applicant submits that this claimed invention, as amended, is neither anticipated nor rendered obvious in view of the prior art references applied against this application. Applicant therefore requests the entry of this Amendment, the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the

RESPONSE UNDER 37 C.F.R. § 1.116  
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undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 20-0668.

Respectfully submitted,

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